



## Global Geodetic Observing System Vision and Mission (Goals and Tasks)

### GGOS Vision:

- Advancing Earth system science by quantifying our planet's changes in space and time

### GGOS Mission:

- **Why GGOS?** We are living on a dynamic planet that requires a continuous quantification of changes in a truly stable reference.
- **What is GGOS?** GGOS is the Global Geodetic Observing System necessary to map and understand changes in Earth shape, rotation and mass distribution.
- **Link to other users:** GGOS is the fundamental backbone for measurement and consistent interpretation of key global change processes and for societal applications.
- **Summary:** GGOS benefits science and society by providing the foundation upon which advances in Earth and planetary system science and applications are built.



- **GGOS Role**
  - Provide the geodetic infrastructure to support Earth Science;
  - Provide data products that rely on the integration of measurements taken by the Services (ILRS, IVS, IGS, IDS, IGS, etc) and space systems;
- **GGOS Themes**
  - Unified Global Height System
  - Natural Hazards
    - Global Earthquake Service (Seismic, InSAR, IGS)
  - Sea Level Change, Variability, and Forecasting



# GGOS 2020 Requirement Summary

- Plan and implement the ground-based co-location network (VLBI, SLR, GNSS, DORIS) required to establish an ITRF that has an **accuracy of 1 mm and a stability of 0.1 mm/yr;**

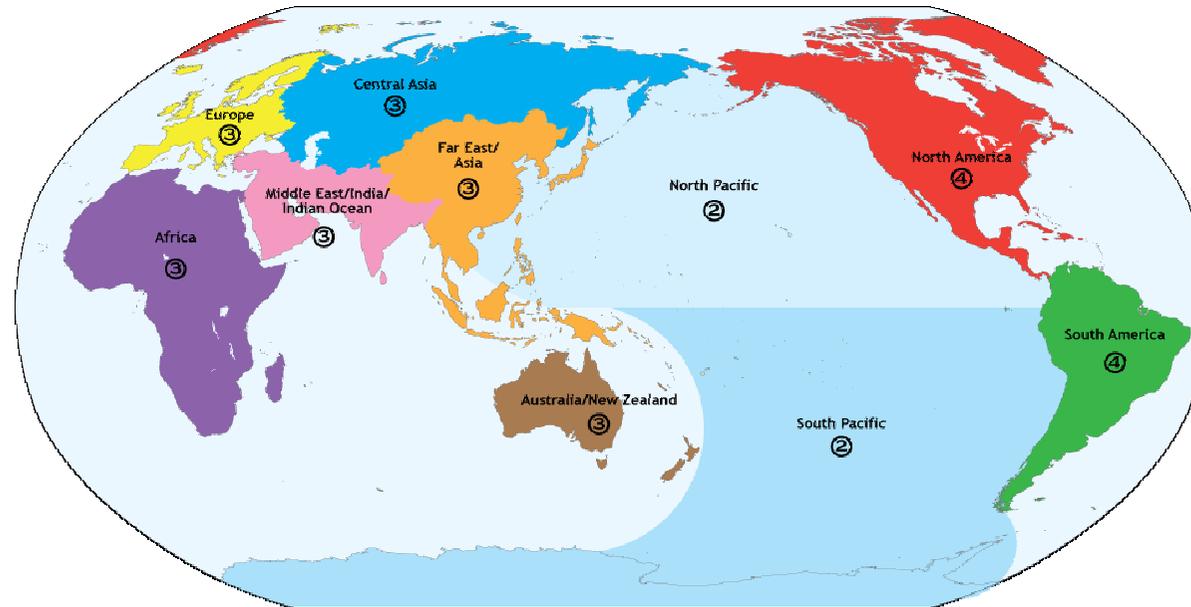
*Improvement of 10 -20 beyond the current quality*

- Implement a ground-based GNSS network to make the ITRF of this quality available everywhere on the surface of the Earth for 24 hours a day;
- Provide the ground-based tracking network to support planned missions;
- Integrate and support gravity field, tide gauges, etc



# Simulation Studies to Scope the Network

(Erricos Pavlis)

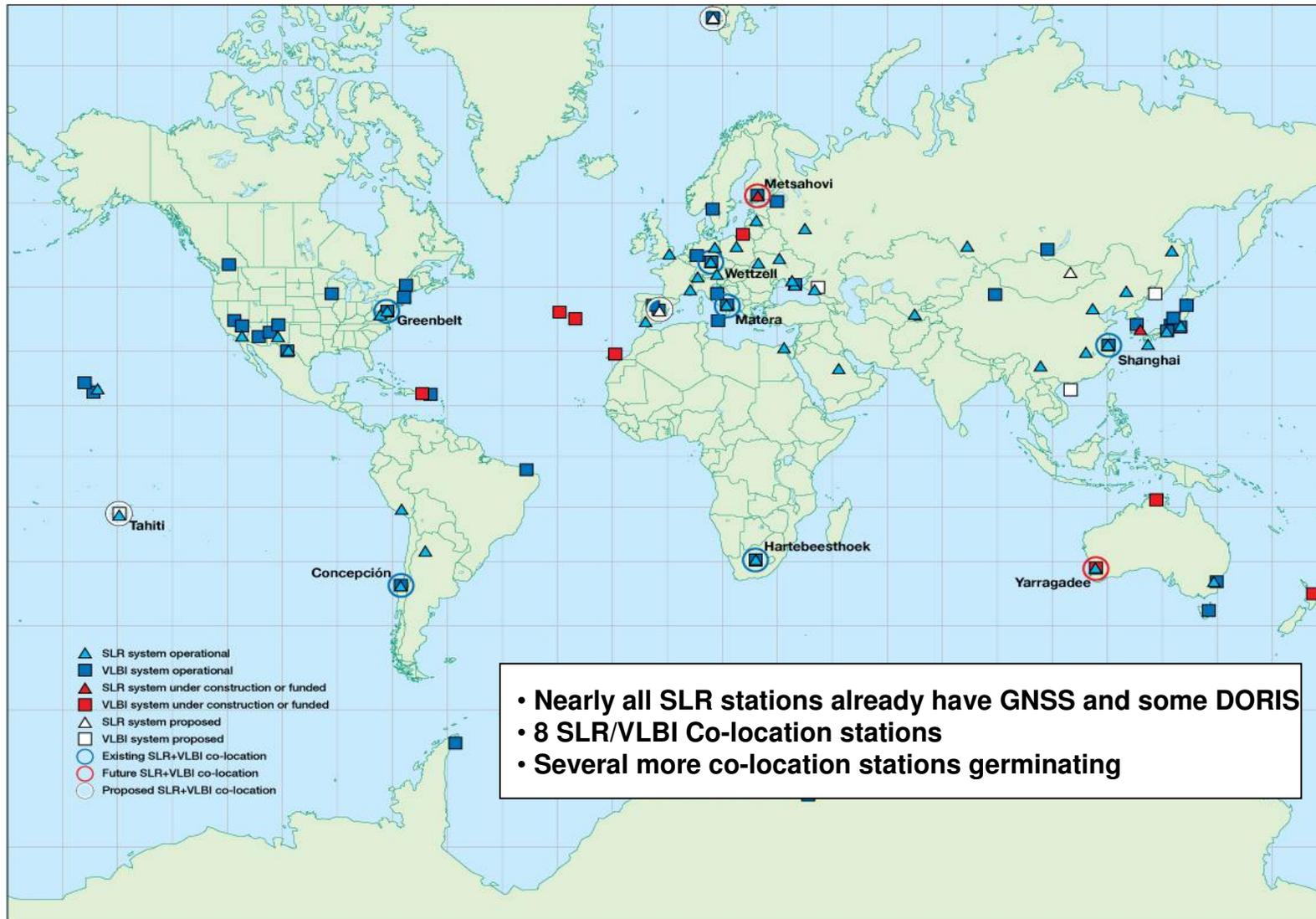


- **First Phase completed**
  - ~30 globally distributed, well positioned, co-location (fundamental) stations with proper conditions;
  - 16 of these co-location stations must track GNSS satellites with SLR to calibrate the GNSS orbits;



# Network of Co-located Stations with VLBI and SLR is Expanding

GGOS Bureau for Networks and Communications





## GGOS Inter-Agency Committee (GIAC)

- **Role**
  - Provide oversight, coordination and guidance for the development, implementation and operation of the GGOS global geodetic infrastructure;
- **Progress:**
  - Terms of Reference and a Declaration have been written;
  - Fourteen agencies have joined and agreed to support the concept; several more are in process
  - Election of officers on April 2 at the GGOS Steering Committee:
    - Chair: John LaBrecque
    - Vice-chair: Gary Johnston
    - Secretariat: BKG (Bernd Richter)
- **Next Steps:**
  - Expand membership and begin the “selling”



## Activities

- Focused mainly on measurement network to support the ITRF;
- Services continue working on the irrespective technologies and expansions;
- Bi-annual meetings at AGU and EGU with the Services;
- On-line files on station and data product information, local ties, mis-closure files, etc
- Simulation activity to scope the co-location network;
- Work on intersystem vector continues at IERS WG on Site Survey and Co-location;
- Call for Participation prepared and reviewed by the Steering Committee; awaiting decision on action by the GIAC;
- Continue outreach activities underway;
- GGOS Fundamental Site Requirements Document underway;
- Proposal to NASA to support the upgrade of the global geodetic network



## GGOS Outreach: Portal, Web Pages

### GGOS Portal:

- Progress on the GGOS Portal:  
URL:<http://observing-system-portal.bkg.bund.de>
- More people should have a look at the portal and comment on it !
- Next step: „fill“ the portal with products and metadata ...

### GGOS Web Pages:

- First release has been finished by the GGOS Coordinating Office
- Pages reviewed by the GGOS Executive Committee
- Pages online: → <http://www.ggos.org>

### GGOS Outreach by all of us:

- Reference GGOS (logo) in all presentations, posters, charts. etc.
- If we want GGOS to be known and work, we need to promote it ...



## Status of the GPS IIIB Retroreflector Array



- The NASA GPSIII Working Group continues working to secure the requirement to incorporate retroreflector arrays onto the GPS Block III satellites.
- Several very productive meetings have recently occurred with various GPS groups to meet the goal, most recently with the GPS Project on Mission Profile.
- The current plan is for up to 17 retroreflector equipped GPS III satellites.
- First launch currently not scheduled until early 2018.
- Plan is to launch 2-3 per year after.
- Current retroreflector array design based on JAXA ETS-8, currently being tracked on geostationary orbit.





# Networks Outreach

- GGOS Network Presentations
  - Space Conference of the Americas, Mexico, November 2010
  - AGU, San Francisco, December 2010
  - EGU, Vienna, April 2011
  - AOGS, Taipei, August 2011
- Meetings
  - Dialog underway with INPE, Sao Paulo, Brazil
  - Instituto Geografico Agustin Codazzi visit to GSFC on May 4,5
  - Meeting with Natural Resources Canada - Geodetic Survey Division
  - Discussions planned with National Chiao Tung University, Taiwan

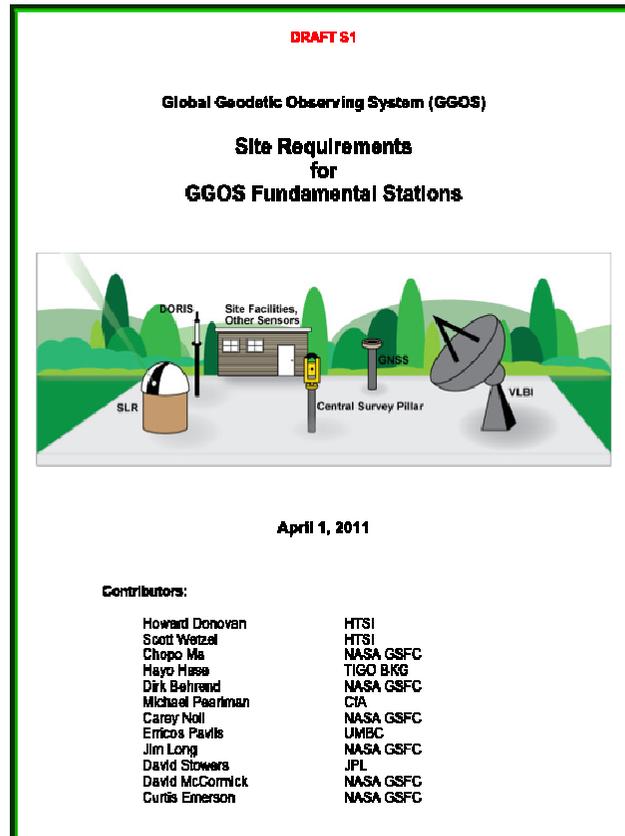


# GGOS Site Requirements Document

GGOS Bureau for Networks  
and Communications

([http://cddis.gsfc.nasa.gov/docs/SiteRecDoc\\_MarchS3\\_cen.pdf](http://cddis.gsfc.nasa.gov/docs/SiteRecDoc_MarchS3_cen.pdf))

(DRAFT)



- **Introduction and Justification**
  - What is a Fundamental Station?
  - Why do we need the Reference Frame?
  - Why do we need a global network?
  - What is the current situation?
  - What do we need?
- **Site Conditions**
  - Global consideration for the location
  - Geology
  - Site area
  - Weather and sky conditions
  - Radio frequency and optical Interference
  - Horizon conditions
  - Air traffic and aircraft Protection
  - Communications
  - Land ownership
  - Local ground geodetic networks
  - Site Accessibility
  - Local infrastructure and accommodations
  - Electric power
  - Site security and safety
  - Local commitment



## **GGOS Call for Participation; The Global Geodetic Core Network: Foundation for Monitoring the Earth System**

**GGOS Bureau for Networks  
and Communications**

**We seek proposals from organizations that would participate in the development, implementation and maintenance of the GGOS Global Geodetic Core Network.**

- **To support the network design and planning activity with analysis, simulations, site research (geology, weather, logistics, personnel, etc). A working group will be formed from those selected to help select the sites and encourage new participants in areas needing coverage.**
- **To help design and develop the inter-technique vector systems and operational procedures.**
- **To implement and operate core space geodesy stations including:**
  - **existing stations that already have the four techniques implemented and plan for upgrade to the next generation systems;**
  - **existing stations that have one or more techniques operational, are planning for upgrade to the next generation systems and for the implementation of the remaining techniques;**
- **To provide applicable space geodetic instruments for implementation at a GGOS Global Geodetic Core Site in cooperation with a local organization.**
- **To implement and operate core stations offered by others;**
- **Disposition awaits GIAC action**



## NASA Space Geodesy Project (NSGP)

- **Provide NASA's contribution to a worldwide network of modern space geodesy fundamental stations;**
- **Phase 1 Proposal developed for a 2-year activity:**
  - **Complete network simulations to scope the network and examine geographic, operational and technical tradeoffs based on Lageos and GNSS tracking with SLR;**
  - **Complete the prototype SLR (NGSLR) and VLBI (VLBI 2010) instruments;**
  - **Co-locate these instrument with the newest generation GNSS and DORIS ground stations at GSFC;**
  - **Implement a modern survey system to measure inter-technique vectors for co-location;**
  - **Develop generalized station layout considering RFI and operations constraints;**
  - **Undertake supporting data analysis;**
  - **Begin site evaluation for network station deployment;**
  - **Develop a full network implementation plan;**
- **Follow-on phase for deployment for up to 10 stations;**
- **Separate Proposal for building of first retroreflector array for future GPS satellites**